STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Modeling, Simulation and Prototyping		**1010642221010640328**

Field of study	Profile of study (general academic, practical)	Year /Semester
Mechanical Engineering	**(brak)**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Mechatronics	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours					No. of credits
Lecture: **2**	Classes: **-**	Laboratory: **1**	Project/seminars: **-**		**3**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**3 100%**
Technical sciences	**3 100%**

Responsible for subject / lecturer:

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Working Machines and Transportation
60-965 Poznań, ul. Piotrowo 3

Responsible for subject / lecturer:

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60-965 Poznań, ul. Piotrowo 3

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	News from the basics of machine design, strength of materials, and the theory of mechanisms and technical engineering, manufacturing technology
2	**Skills**	Efficient use of Microsoft Orfice, the ability to create control programs for simple machine elements in CAD / CAM
3	**Social competencies**	Able to work in a group performing different roles

Assumptions and objectives of the course:

The aim of the lectures and laboratories is to teach students the modeling and analysis of kinematic machine design including matching models of virtual and real. To acquaint students with modern techniques of production and prototyping

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has an extended knowledge in the area of information technology concerning computer programming and software for engineering calculations and simulation of physical systems.computer programming and software for engineering calculations and simulation of physical systems. - [K2A_W05]

2. Knows modern methods of engineering graphics and theoretical basis for calculation using finite elements method - [K2A_W06]

3. Has an extended knowledge of modern production technologies used in the design of the production process of machine parts and their assembly with the use of CAM tools - [K2A_W11]

Skills:

1. He can correctly select the optimal material and processing technology for the typical working machines including the latest achievements of materials science - [K2A_U06]

2. Is able to perform a fairly complex design project of an average working machine or a subsystem using modern CAD tools, including tools for spatial modeling machines and finite elements calculation method. - [K2A_U07]

3. Is able to program a part manufacturing technological process, including a simple program to control a machine tool. - [K2A_U10]

Social competencies:

1. Understands the need for lifelong learning; is able to inspire and organize the learning process of others - [K2A_K01]
2. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment, is aware of responsibility for decisions. - [K2A_K02]
3. Is able to interact in a group taking on the different roles. - [K2A_K03]

Assessment methods of study outcomes
-Lecture, lab credit.
Course description
-Modeling and analysis of the proposed product in terms of kinematics. Define a pair of nodes and kinematic functions, defining the relative movement of ways. Entering and generate various types of extortion, calculating the coordinates of displacement, velocity and acceleration mechanisms of members and the forces of reaction in each of the kinematic pairs. Animation individual configuration and visualization of motion of the whole team. Export of the simulations results to strees analysis module. Simulations will be conducted on the basis ot a special software.

Basic bibliography:

1. Przybylski W., Deja M., Komputerowo wspomagane wytwarzanie maszyn. WNT, Warszawa 2007
2. Marciniak K, Putz B., Wojciechowski J., Obróba powierzchni krzywoliniowych na frezarkach sterowanych numerycznie. WNT, Warszawa 1988
3. Marciniak M (red) Elementy automatyzazcji we współczesnych procesach wytwarzania. Wydawnictwo Politechniki Warszawskiej 2007
4. Altinas Y., Manufacturing Automation, Cambridge University Press 2006
5. Hanczarenko J. Obrabiarki sterowane numerycznie WNT Warszawa 2008

Additional bibliography:

Result of average student's workload

Activity	Time (working hours)
1. Participation in lectures	30
2. Consultation on the material given in lectures	2
3. Exam Preparation	10
4. Participation in the exam	2
5. Participation in laboratory exercises	15
6. Preparation to laboratory exercises	15
7. Preparing to pass laboratory	10
8. Participation in passing laboratory exercises	2

Student's workload

Source of workload	hours	ECTS
Total workload	86	3
Contact hours	51	2
Practical activities	42	2